

Namn: _____

Uppgift nr: _____

Personnummer: _____

Sida nr: _____

a)

$$\underline{F_x = m \times a_x + F_{W_x} + F_{B_x}}$$

$$F_x = 68 \times 2,9 \times 0,82 + 24 + 8 = \underline{\underline{194 \text{ kN}}}$$

$$\underline{F_y = m \times a_y + F_{W_y} + F_{B_y}}$$

$$F_y = 68 \times 6,3 \times 0,82 \times 1,14 + 72 + 24 = \underline{\underline{496 \text{ kN}}}$$

$$F_z = m \times a_z$$

$$F_z = 68 \times 6,2 \times 0,82 = \underline{\underline{346 \text{ kN}}}$$

$$b) \mu \times m \times g = 0,3 \times 68 \times 9,81 = \underline{\underline{200 \text{ kN}}}$$

$$c) b \times m \times g = 2 \times 68 \times 9,81 = \underline{\underline{1334 \text{ kNm}}}$$

$$d) CS_1 \times f_1 + CS_2 \times f_2 = 5,6$$

$$CS = \frac{MSL}{1,5} = \frac{10,5 \times 0,8}{1,5} = \underline{\underline{5,6}}$$

$$= \underbrace{5,6 \times 9,81 \times 2 \times 0,47}_{\text{höga}} + \underbrace{5,6 \times 9,81 \times 2 \times 0,87}_{\text{låga}}$$

höga

52 kN

+

låga

96 kN

= 148 kN

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$$e) C_{s1} \times e_1 + C_{s2} \times e_2 \dots$$

$$\underbrace{5,6 \times 9,81 \times 2 \times 5,4}_{\text{höga}} + \underbrace{5,6 \times 9,81 \times 2 \times 3,9}_{\text{läga}}$$

$$573 \text{ kNm} + 397 \text{ kNm} = \underline{\underline{970 \text{ kNm}}}$$

↓ glidning

$$F_y \leq \mu \times m \times g + C_{s1} \times f_1 + C_{s2} \times f_2 \dots$$

$$\left[a_y \leq b_1 + d_1 \right]$$

$$496 \leq 200 + 148 \Rightarrow \underline{\underline{\text{NOT OK}}}$$

Tipping

$$F_y \times a \leq b \times m \times g + C_{s1} \times e_1 + C_{s2} \times e_2 \dots$$

$$\left[1488 \leq e_1 + e_2 \right]$$

$$1488 \leq 1334 + 990 \Rightarrow \underline{\underline{\text{OK}}}$$

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g)

$$F_x \leq \mu (m \times g - F_z) + C_{s1} \times f_1 + C_{s2} \times f_2$$

$$194 \leq \underbrace{0,3(68 \times 9,81 - 346)}_{2,28 \text{ kN}} + 5,6 \times 9,81 \times 8 \times 0,3$$

OK

h)

$$F_y = 496 \text{ kN}$$

Frictionen tar hand om 200 kN

→ återstår 296 kN för surringar

$$296 = C_{s1} \times f_1 + C_{s2} \times f_2$$

$$296 = C_s \times 9,81 \times 2 \times 0,47 + C_s \times 9,81 \times 2 \times 0,87$$

$$C_s = \frac{296}{(9,81 \times 2 \times 0,47 + 9,81 \times 2 \times 0,87)} = 11,3$$

$$C_s = \frac{1752}{1,5} ; C_s = \frac{NBH \times 0,8}{1,5}$$

$$NBH = \frac{11,3 \times 1,5}{0,8} = \underline{\underline{21,2 \text{ tonner}}}$$